

## CLAIMS

1. A protection circuit for protecting a battery  
pack having rechargeable batteries connected in series  
5 from overcurrents and overvoltages,

the protection circuit comprising:

a protection device having a heating resistor and a  
fuse element provided on a circuit board; and

sensing means for detecting an overvoltage across  
10 any of the batteries in the battery pack and switching a  
current flowing into the heating resistor, wherein

the fuse element is melted in an overcurrent  
condition, and in an overvoltage condition on any of the  
batteries, the sensing means switches on the current  
15 flowing into the heating resistor, thereby causing the  
heating resistor to generate heat and the fuse element to  
be melted.

2. The protection circuit according to claim 1,  
20 comprising a plurality of sensing means for sensing an  
overvoltage between different batteries, wherein in an  
overvoltage condition on any of the batteries, the sensing  
means switches on a current flowing into the heating  
resistor.

3. The protection circuit according to claim 1 or 2,  
wherein in the overvoltage condition on any of the  
batteries, a voltage across a predetermined number of the  
5 batteries in the battery pack is applied to the heating  
resistor.

4. A protection circuit for protecting a battery  
pack having rechargeable batteries connected in series  
10 from overcurrents and overvoltages,

the protection circuit comprising:

protection devices each having a heating resistor  
and a fuse element provided on a circuit board; and

sensing means for detecting an overvoltage across  
15 any of the batteries in the battery pack and switching a  
current flowing into the heating resistor, wherein:

the plurality of protection devices are connected in  
parallel;

in an overcurrent condition, the fuse element is  
20 melted at each protection device; and

in an overvoltage condition on any of the batteries,  
the sensing means switches on the current flowing into the  
heating resistor, thereby causing a voltage across a  
predetermined number of the batteries in the battery pack

to be applied to the heating resistor of each protection device, the heating resistor to generate heat, and the fuse element to be melted.

- 5           5. The protection circuit according to claim 4, wherein the heating resistor is connected with a rectifier element to prevent conduction resistance from remaining via the heating resistor when an overcurrent has caused the fuse element to be melted incompletely.

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